

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 09991-258WO1	FOR FURTHER ACTION		see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US 07/84771	International filing date (<i>day/month/year</i>) 15 November 2007 (15.11.2007)	(Earliest) Priority Date (<i>day/month/year</i>) 16 November 2006 (16.11.2006)	
Applicant FUJIFILM DIMATIX, INC.			

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:



the international application in the language in which it was filed.



a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6b*is*(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the title,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the abstract,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the drawings to be published with the abstract is Figure No. 1



as suggested by the applicant.



as selected by this Authority, because the applicant failed to suggest a figure.



as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 07/84771

A. CLASSIFICATION OF SUBJECT MATTER

IPC(B) - B28B 11/06 (2008.04)

USPC - 264/11, 129, 131, 132; 347/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

USPC: 264/11

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 264/11, 129, 131, 132; 347/68

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Pubvest : (USPT, PGPB, EPAB, JAB), Google patent, USPTO

Search terms: flowable substrate, layer, media, jetting fluid, image, pattern, ink jet, droplet, print, extrude, dia, viscoelastic, plastic, plant, varnish, metal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 2005/0157148 A1 (Baker et al.) 21 July 2005, (21.07.05) (Para [0004] - [0007] [0016] [0018]-[0021] [0028])	12-13 1-11, 14-34
Y	US 6,207,003 B1 (McClure et al.) 27 March 2001 (27.03.2001) (col 2 in 12-14, 26, 30-31) (col 5 in 6-7, 15, 42-43) (col 8 in 19-20)	1-11, 14-19, 29-31
Y	US 2005/0067292 A1 (Thompson et al.) 31 March 2005 (31.03.2005) (Para [0089] [0090])	20-21, 28
Y	US 5,340,656 A (Sachs et al.) 23 August 1994 (23.08.1994) (col 2 in 62-63, 66) (col 3 in 1-7, 12, 14, 45-50) (col 4 in 38)	9, 22-28, 31-34
Y	US 6,673,416 B1 (Nishio) 6 January 2004 (06.01.2004) (col 4 in 14-15)	25, 34

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"I"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

18 October 2008 (18.10.2008)

Date of mailing of the international search report

10 NOV 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Lee Y. Young

PCT Helpdesk: 571-372-4300

PCT OSP: 571-272-7774

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: JOHN J. GAGEL
FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

10 NOV 2008

Applicant's or agent's file reference
09991-258WO1

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/US 07/84771

International filing date (day/month/year)
15 November 2007 (15.11.2007)

Priority date (day/month/year)
16 November 2006 (16.11.2006)

International Patent Classification (IPC) or both national classification and IPC
IPC(B) - B28B 11/06 (2008.04)
USPC - 264/11,129,131,132

Applicant FUJIFILM DIMATIX, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Date of completion of this opinion

18 October 2008 (18.10.2008)

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 07/84771

Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:
- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established on the basis of:
- a. type of material
- ☐ a sequence listing
- ☐ table(s) related to the sequence listing
- b. format of material
- ☐ on paper
- ☐ in electronic form
- c. time of filing/furnishing
- ☐ contained in the international application as filed
- ☐ filed together with the international application in electronic form
- ☐ furnished subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	1-11, 14-34	YES
	Claims	12-13	NO
Inventive step (IS)	Claims	none	YES
	Claims	1-34	NO
Industrial applicability (IA)	Claims	1-34	YES
	Claims	none	NO
2. Citations and explanations:			
<p>Claims 12 and 13 lack novelty under PCT Article 33(2) as being anticipated by US2005/0157148 A1 to Bakar et al. (hereinafter 'Bakar')</p> <p>As per claim 12 Bakar discloses a method of printing depositing, or coating comprising: depositing a layer of a flowable non-food substrate on an article; (para [0020][0028] and jetting fluid to form a pattern on the flowable substrate layer.; (para [0005]).</p> <p>As per claim 13 Bakar discloses a method of claim 12, wherein the flowable substrate layer has a viscosity of about 30,000 Poise or less (para [0004] [0007] [0021]).</p> <p>Claims 1-8, 10-11, 14-19 and 29-30 lack an inventive steps under PCT Article 33(3) as being obvious in view of Bakar and further in view of US 6,207,003 B1 McClure et al. (hereinafter 'McClure')</p> <p>As per claim 1 McClure teaches a method of printing, depositing, or coating on a flowable substrate comprising: McClure teaches extruding a flowable non-food substrate on a support (col 2 in 14); but fails to disclose jetting fluid to form an image on the flowable substrate however Bakar teaches jetting fluid to make image (para[0006][0019]). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of McClure and Bakar and have a method of printing, depositing as described in claim to improve electrical property of the layer.</p> <p>As per claim 2 Bakar discloses a method of claim 1, further comprising transforming the flowable substrate into a solid state after jetting fluid on the flowable substrate.; (para [0025].</p> <p>As per claim 3 Bakar teaches a method of claim 2, but fails to disclose wherein transforming comprises placing the flowable substrate in a water bath, however McClure teaches cooling flowable substrate with cooling water (col 5 in 42-43). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Bakar and McClure and cool the substrate to solidify the layer.</p> <p>As per claim 4 Bakar discloses the method of claim 1, wherein the fluid is jetting using an ink jet printer para [0004].</p> <p>As per claim 5 Bakar discloses a method of claim 1, further comprising moving the flowable substrate along a conveyor (para [0016]).</p> <p>As per claim 6 McClure further teaches the method of claim 1 but fails to specify wherein the flowable substrate comprises a viscoelastic material however McClure teaches liquid polymer material (col 5 in 6-7,15). Thus it would have been obvious to one of ordinary skill in the art to have polymer which is viscoelastic in order to optimize the electrical and mechanical properties of coating.</p> <p>As per claim 7 McClure further teaches the method of claim 6, but fails to teach wherein the viscoelastic material comprises molten plastic, however McClure teaches liquid polymer material (col 5 in 6-7,15). Thus it would have been obvious to one of ordinary skill in the art to replace polymer with molten plastic to get the desired properties of coating material.</p> <p>As per claim 8 McClure teaches the method of claim 1, but fails to specify wherein the flowable substrate is extruded through a die to form an extrudate however McClure teaches patterning wheel (col 2 in 14-15). Thus it would have been obvious to one of ordinary skill in the art to modify the design to extrudate flowable substrate to design any pattern.</p> <p>As per claim 10 and 19 Bakar discloses a method of claim 1, wherein the fluid comprises ink droplets. (para[0019]).</p> <p>As per claim 11 Bakar discloses a method of claim 1, wherein the flowable substrate has a viscosity of about 30,000 Poise or less (para [0004] [0007] [0021]).</p> <p>As per claim 14 Bakar discloses the method of claim 12, but fails to teach further comprising curing the flowable substrate layer from a flowable state into a solid state after jetting fluid droplets on the flowable layer however McClure teaches curing flowable substrate (col 6 in 19-20). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of McClure and Bakar and have flowable layer cured to adjust the viscosity.</p>			

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

As per claim 15 Baker discloses a method of claim 12, but fails to disclose wherein the flowable layer and pattern form a surface, and a second flowable substrate layer is coated on the surface. However McClure teaches multiple layers (col 2 in 30-31). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of McClure and Baker and have multiple layers to improve electrical property of the layer.

As per claim 16 Baker further teaches the method of claim 15, further comprising jetting fluid to form a second pattern on the second flowable layer (para [0005]).

As per claim 17 and 30 McClure further teaches the method of claim 16, further comprising curing the flowable layers after jetting the second pattern on the surface (col 2 in 26).

As per claim 18 McClure further teaches the method of claim 17, wherein the patterns and layers form a wood grain, texture, or decorative pattern (col 2 in 18-19).

As per claim 29 McClure and Baker teaches a system for jetting fluid on a flowable non-food substrate, comprising:

Baker teaches an ink jet printer to jet fluid on a substrate in a pattern; (para [0005])
a support for a flowable non-food substrate adjacent to the ink jet printer so that the ink jet printer can jet fluid on the flowable substrate; (para [0004]) and McClure further teaches an extruder configured to extrude the flowable substrate onto the support upstream from the ink jet printer (col 2 in 14). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of McClure and Baker and have method of printing, depositing as described in claim to improve electrical property of the layer.

Claims 20-21 lack an inventive steps under PCT Article 33(3) as being obvious in view of A1 to Baker and further in view of US 2005/0067292 A1 to Thompson et al. (hereinafter 'Thompson')

As per claim 20 Baker teaches the method of claim 12, but fails to disclose wherein the flowable substrate is a member selected from the group consisting of coatings, glazes, paints, and varnishes. However Thompson teaches coating (para[0089]. Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Baker and Thompson and coat the flowable substrate to give smooth layer.

As per claim 21 Thompson further teaches the method of claim 20, wherein the coatings comprise dielectric material (para[0089].

Claims 22-24, 26-27 and 32-33 lack an inventive steps under PCT Article 33(3) as being obvious in view of Baker and US 5,340,856 A to Sachs et al. (hereinafter 'Sachs')

As per claim 22 Baker further teaches the method of claim 12, but fails to teach wherein the article comprises wood, plastic, metal, or ceramic. However Sachs teaches article comprises plastic, metal, or ceramic (col 2 in 62-63). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Baker and Sachs and have article comprising, plastic, metal, or ceramic to give versatility in coating surfaces.

As per claim 23 Baker teaches the method of claim 12, but fails to specify wherein the article comprises medium density fiber board wood, however Sachs teaches article comprises plastic, metal, or ceramic (col 2 in 62-63). Thus it would have been obvious to one of ordinary skill in the art to modify the teachings of Sachs and include fiber board wood as substrate.

As per claim 24 Sachs teaches a method of printing, depositing or coating comprising:
applying powder on a surface of a support; (col 2 in 62), Baker further teaches jetting fluid on the powder on the support; (para[0006][0019]) and Sachs further teaches

causing the powder to flow and coat the surface of the support (col 2 in 66, col 3 in 1-2).

Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Sachs and Baker and have method of printing, depositing with a powder layer thus improving the resolution and improving production.

As per claim 26 Sachs further discloses the method of claim 24, wherein the powder comprises a thermoset or thermoplastic material (col 3 in 12-14 and (col 4 in 38).

As per claim 27 Baker discloses a method of claim 24, wherein the fluid is jetted using a piezoelectric printhead (para [0018]).

As per claim 32 Baker teaches a system for depositing jetting fluid on a powdered surface of a substrate, comprising:

an ink jet printer to jet fluid on a substrate in a pattern; (para [0004])

a support for a substrate adjacent to the ink jet printer so that the ink jet printer can jet fluid on the substrate; (para [0004]) and Sachs further teaches

a station for dispensing powder on a surface of the substrate upstream from the ink jet printer (col 3 in 45-50). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Sachs and Baker and have method of printing, depositing with a powder layer thus improving the resolution and improving production.

As per claim 33 Sachs further teaches the system of claim 32, further comprising a station to cause the powder to flow and cover the surface of the substrate (col 3 in 45-50).

Claims 9 and 31 lack an inventive steps under PCT Article 33(3) as being obvious in view of Baker and McClure and Sachs.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 07/04771

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

As per claim 9 and 31 McClure teaches the method of claim 1 and 29 but does not teach further comprising forming the substrate into individual articles. However Sachs teaches making parts from substrate (col 3 in 2-7). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of McClure, Baker and Sachs have method of making individual articles using the flowable substrate.

Claims 28 lack an inventive step under PCT Article 33(3) as being obvious in view of Sachs, Baker and further in view of Thompson.

As per claim 28 Sachs and Baker teaches the method of claim 24, but fails to teach wherein the support comprises metal. However Thompson teaches metal support (para[0090]). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Sachs and Baker and Thompson to have metal support to make it conductive.

Claims 25 and 34 lack an inventive steps under PCT Article 33(3) as being obvious in view of Baker and Sachs and further in view of US 6,673,416 B1 to Nishio (hereinafter 'Nishio').

As per claim 25 Sachs and Baker teaches the method of claim 24, but fails to teach wherein the powder is electrostatically applied to the support. However Nishio teaches applying powder electrostatically (col 4 in 14-15). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Sachs and Baker and Nishio and have smooth coating surface.

As per claim 34 Sachs and Baker teaches the system of claim 32, but fails to teach wherein the powder is electrostatically applied to the surface. However Nishio teaches applying powder electrostatically (col 4 in 14-15). Thus it would have been obvious to one of ordinary skill in the art to combine the teachings of Sachs and Baker and Nishio and have smooth coating surface.

Claims 1-34 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made and used in industry.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

JOHN J. GAGEL
FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing (day/month/year)	10 NOV 2008
Applicant's or agent's file reference 09991-258WO1	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US 07/84771	International filing date (day/month/year) 15 November 2007 (15.11.2007)
Applicant FUJIFILM DIMATIX, INC.	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 740 14 35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within 19 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 20 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-273-4300
PCT OSP: 571-272-7774

Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)